Summary

During ventricular asystole in spontaneously occurring Stokes–Adams attacks and following rapid intravenous injections of acetylcholine systemic blood pressure fell to low levels.

During cardiac standstill of up to 21 seconds arterial pressure remained constant at 20 to 25 mm. Hg.

An " overshoot " occurred in the blood pressure following the resumption of ventricular contractions in both forms of asystole : systolic and diastolic pressures increased above control levels before arterial pressure returned to normal.

It is suggested that this action of intravenous acetylcholine results from asystole only.

The cases investigated were under the care of the physicians to St. Thomas's Hospital and the National Heart Hospital.

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HIATUS HERNIA AND PREGNANCY

A REVIEW OF NINE CASES AND THE LITERATURE

BY

W. A. W. DUTTON, M.B., M.R.C.S.
D.Obst.R.C.O.G.

AND

H. J. BLAND, M.B., Ch.B., D.Obst.R.C.O.G.
Formerly Resident Obstetric Officers, Southmead General Hospital, Bristol

Herniation of part of the stomach through the oesophageal hiatus of the diaphragm is a fruitful source of errors in diagnosis. Although this disorder is being detected more often (Avery Jones, 1952), it is still commonly overlooked.

Hiatus hernia is probably due in most cases to factors operating in adult life. Laxity of the tissues, with deficiency at the oesophageal ring, is common (Harrington, 1945). Hernia at this site is favoured by conditions raising intra-abdominal pressure and by recumbency. Such herniae may be oesophago-gastric or para-oesophageal, termed by Allison (1951) the sliding and rolling types, which may be present together.

The symptoms are protean, and have been well described by Nicholson (1952). Epigastric discomfort and vomiting are common. If the disorder is complicated by reflux oesophagitis there may be intense " burning pain " behind the lower end of the sternum, which may radiate up to the neck. There may be slight dysphagia, and a gastric ulcer may develop near the cardia. Retching of blood-stained fluid may proceed to frank haematemesis and melaena. Stricture may develop at the lower end of the oesophagus.

Review of Literature

Reports of hiatus hernia complicating pregnancy are infrequent. All authors emphasize that symptoms are aggravated by recumbency, worsen in the last trimester, and tend to clear up after delivery. Heartburn is particularly constant. Evans and Bouslog (1940) reported four cases in which this symptom was almost intractable, and Bush (1950) reported a similar case in which radiation of the pain to the ears was a bizarre addition. Vomiting may be severe and often culminates in haematemesis, which has been described by Schnepp (1943), Queries and Minor Notes (1937), Bourgeois and Hood (1949), Simmons *et al.* (1950), and Hahn (1952). Murless (1947) reported two cases of large para-oesophageal herniae causing vomiting and dyspnoea in pregnancy. Penman (1951) added to the literature four cases in which hiatus hernia produced persistent gastro-intestinal disturbances during pregnancy.

Vinson (1921, 1923) described nine cases of oesophageal stricture following severe vomiting in pregnancy. Some of the records of these cases suggest that they were due to hiatus hernia. Rennie, Land, and Park (1949) described five cases of pregnant women who developed dysphagia and retrosternal pain in the latter months of pregnancy. Hiatus hernia associated with a short oesophagus and stricture was present in all five cases. In three, active oesophageal ulceration was demonstrated. Allison, Johnstone, and Royce (1943) described a similar case.

Case Reports

The following cases came to our notice during routine duties in 1950–2.

Case 1.—The patient, a 2-gravida, 1-para aged 31, was a thin woman whose previous health and first pregnancy were entirely normal. Her second pregnancy (estimated date of delivery, October 2, 1951) was complicated. Morning nausea and retching began at the sixth week and persisted throughout pregnancy. During the second trimester there were repeated attacks of " burning " pain behind the xiphoid, exacerbated by meals, recumbency, and stooping forward. Symptoms were worse at night and during the third trimester. Vomiting became so frequent that she was admitted to hospital at the thirty-eighth week and treated symptomatically. Her condition fluctuated until September 24, when, with the spontaneous onset of labour, vomiting culminated in a haematemesis. Labour was inert, and copious vomiting resulted in dehydration and ketosis. Intravenous fluids and gastric aspiration were begun, but a second haematemesis occurred which required blood transfusion. After spontaneous rupture of the membranes her condition improved and normal delivery followed. During the puerperium there were no untoward symptoms. On the ninth day a barium-meal examination showed a small para-oesophageal hernia without oesophageal ulceration or stricture. The stomach and duodenum were normal. We have been unable to trace the patient for a follow-up.

Case 2.—A 4-gravida, 3-para aged 32 attended the antenatal clinic at 20 weeks ; the estimated date of delivery was January 8, 1952. She was a thin woman and complained of nausea, heartburn, and retching dating from the first month. No abnormality was found on clinical examination. At subsequent visits she reiterated these symptoms, for which a variety of alkaline medicines gave little relief. During the last trimester she emphasized that the heartburn was much worse at night, was better when she got up to vomit, only to recur when she lay down. From the thirty-eighth week the pain was noted to radiate up to the neck, and there was occasional dysphagia. On January 4 she vomited a few ounces of bright-red blood and was admitted to hospital. She responded fairly well, being nursed propped

up and given a light diet. Vomiting was only occasional, and labour on January 8 was uncomplicated, as was the puerperium. On the seventh day a barium-meal examination revealed a simple sliding hiatus hernia. The stomach and duodenum were normal. When seen in September, 1952, she had very occasional heartburn. A barium-meal examination was entirely normal.

Case 3.—A 2-gravida aged 40 was admitted to hospital on April 2, 1951, for a gynaecological operation. On routine questioning about her pregnancies, she stated that during the first pregnancy, 13 years previously, she had suffered from severe heartburn and vomiting from the sixth week. From the seventh month she had had to sleep propped up, so severe was the pain when she lay down. Symptoms cleared up with the onset of labour ("I never had a sick labour"). The second pregnancy, five years later, was "like a repetition of the first." After her pregnancies she kept fairly well until she became obese. In recent months she had experienced several attacks of heartburn, "indigestion," and vomiting relating to posture, being worse when lying down or stooping. She sometimes vomited "lumps like liver." A barium-meal examination revealed a large Type I hiatus hernia with marked regurgitation of stomach contents when in the prone position. Reduction and repair of the hernia was undertaken in the thoracic unit of another hospital. She has since been symptom-free, and was last seen in September, 1952.

Case 4.—A primipara aged 25 was admitted to hospital as an emergency case on February 5, 1952. She was 36 weeks pregnant. Her previous health had been normal. She had had slight morning sickness from the first month of pregnancy. From the fifth month she suffered from recurrent "burning" substernal pains, especially when prone at night, with occasional small vomits. During the month before admission the vomiting, though more frequent (sometimes ten times a day), was not copious. The patient was nursed propped up in bed. A normal diet was fairly well tolerated, but heartburn and vomiting recurred at intervals. A barium-meal examination on February 13 showed a Type I hiatus hernia, without complications. By February 20 the vomiting had become more persistent, and, after failure of medical induction, surgical induction of labour was undertaken. The progress of labour was unsatisfactory; vomiting became very severe, but there was no haematemesis. Dehydration and ketosis necessitated intravenous fluids, and labour was terminated after two hours in the second stage, by episiotomy and low forceps extraction under local analgesia. The puerperium was uncomplicated. She was well and symptom-free in May, 1952.

Case 5.—A primipara aged 25, 36 weeks pregnant, was admitted to hospital on February 15, 1952, as a case of rheumatic heart disease. She had been well until about 20 weeks, when she began to suffer from heartburn, retching, and occasional vomiting, especially at night, relieved by sitting or standing. Between the twenty-eighth and thirty-sixth weeks her exercise tolerance deteriorated, she became orthopnoeic, and she slept propped up at night. Henceforth, the heartburn, retching, and vomiting concerned her much less, although still present. On February 2 chest screening was undertaken, and a barium swallow confirmed enlargement of the left antrum and, concurrently, a small Type I hiatus hernia. Caesarean section under epidural anaesthesia was performed because of severe pre-eclampsia. There were no puerperal complications. A barium meal in September, 1952, failed to demonstrate a hiatus hernia.

Case 6.—A 2-gravida, 1-para aged 34, whose previous health had been good, was admitted as an emergency case on February 2, 1951, being 28 weeks pregnant. There had been severe vomiting during the first trimester in both pregnancies. The second pregnancy was further complicated by epigastric pains, which were particularly severe as pregnancy advanced. Vomiting was almost continuous for four days before admission, when she was noted to be thin and dehydrated, with ketonuria. The vomit was blood-stained. She was nursed sitting up in bed, and given parenteral fluids and a continuous intragastric milk drip. A barium meal on February 5 showed a large Type I hiatus hernia without complications. She was discharged home symptom-free, and was subsequently delivered at term at another hospital. In July there was still slight indigestion, and a barium meal showed that the hernia was still present but was much smaller.

Case 7.—A primigravida aged 23 was admitted as an emergency case on December 7, 1950, when 35 weeks pregnant. There had been slight nausea and vomiting during the first trimester, and then no complaint until heartburn and vomiting began at 20 weeks. Symptoms were worse when lying down at night, and were relieved by sitting up. After a severe bout of vomiting, she was admitted to hospital. Dehydration required drip therapy, and she was discharged symptom-free on the seventh day. Symptoms recurred, but were mild until January 11, 1951, when she was admitted in labour. Labour was inert, there was continuous post-xiphoid pain, and frequent vomiting of small amounts of stale blood occurred. Intravenous fluids were given, and normal delivery followed. The puerperium was uncomplicated. In May she complained of dysphagia and had lost 28 lb. (12.7 kg.) in weight. A barium meal showed a hiatus hernia with an oesophageal stenosis immediately above it, about 2 cm. in length. This was later confirmed by oesophagoscopy, during which the oesophagus bled easily. The stricture was subsequently successfully resected.

Case 8.—A 2-para aged 40 had her first pregnancy in 1931. It was characterized by severe vomiting throughout and severe nocturnal post-xiphoid pains related to posture. Vomiting during labour had been severe, but was absent in the puerperium. The second pregnancy, in 1943, was like a repetition of the first. In recent years she had become plump, and the post-xiphoid pains had returned, being worse at night and on bending forwards, but were relieved by alkalis, vomiting, or sitting up. A barium meal in July, 1951, revealed a fairly large hiatus hernia.

Case 9.—A primigravida aged 24 was admitted on September 25, 1950, complaining of pains in the right iliac fossa, and persistent nausea and vomiting. Laparotomy revealed a 16 weeks pregnancy; a simple cyst of the right ovary was removed, together with a normal appendix. She remained well for six weeks, then began to suffer from severe nausea and vomiting, especially when lying down and after meals. On readmission on March 3, 1951, she was dehydrated, and 24 hours later she had a small haematemesis. Persistent vomiting necessitated almost continuous intravenous fluids. A barium-meal examination on March 8 revealed a Type I hiatus hernia with probable oesophageal ulceration. Surgical induction of labour was undertaken, but the first stage was inert, and she continued to vomit blood-stained fluid. As the maternal condition was deteriorating labour was terminated by caesarean section after 48 hours. A barium swallow on the twelfth post-operative day revealed marked functional improvement of the cardia, with little tendency to regurgitation of barium. A small tubular hiatal protrusion was still present, but only in the optimum position. There was no evidence of ulceration. In May, 1952, the patient was still complaining of nausea, heartburn, and occasional vomiting.

Discussion

Rigler and Eneboe (1935) have shown that the association of hiatus hernia with pregnancy is common, but they were unable to demonstrate any correlation between gastric symptoms and the presence or absence of hernia.

On consideration of the manner in which hiatus hernia can produce symptoms these findings are unexpected. It is possible that hiatus hernia in pregnancy is often overlooked for a variety of reasons. In current teaching concerning vomiting in pregnancy, neurosis is often cited, and some of the symptoms of hiatus hernia do suggest a functional illness. Further, the vomiting caused by hiatus hernia frequently ceases when the patient rests sitting up in bed, and

may cease to vomit throughout her stay in hospital, thus testing the credulity of her medical attendant.

A radiologist needs skill and experience to demonstrate a hiatus hernia. Resolution is rapid in the puerperium, and attempts to make a post-partum diagnosis may be unsuccessful because of the diminution in size of the hernia, or even its disappearance. Rigler and Eneboe (1935), Bourgeois and Hood (1949), and Schnepp (1943) all commented on this feature, our experience of which has been similar.

It is not intended to claim that hiatus hernia always causes trouble in pregnancy, or that such a hernia is always responsible for heartburn, vomiting, or haematemesis. We have seen cases illustrating the contrary.

It would seem that there is a need for a large-scale investigation to ascertain the role of hiatus hernia in heartburn and vomiting of pregnancy.

Summary

The association of hiatus hernia with pregnancy is described.

Nine cases with symptoms attributed to a hiatus hernia in pregnancy are reported.

The literature is briefly reviewed.

The need for further investigation is recognized.

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In his annual report the Medical Director of the Central Middlesex Hospital, Dr. Horace Joules, states that despite efforts to reduce the surgical waiting-list it still stands at well over 1,000. This number had been somewhat lessened by the co-operation of several other hospitals which had taken over large numbers, but last winter's fog and the subsequent high incidence of influenza had caused such a demand for acute admissions that the number waiting for surgery had risen to its previous height. Dr. Joules said that it was known that several London hospitals had practically no waiting-list, and he suggested that the time had come to evolve some system of transfer of cases for elective surgery between one hospital and another. A committee had been set up to inquire into the out-patient position, and had agreed that any further increase in numbers must be avoided. Closer association between practitioners and the hospital had been maintained by meetings of local health liaison committees and clinical meetings and courses. The opening of a new mass *x*-ray unit, domiciliary visiting, and the provision of additional beds had ensured early treatment of new cases of pulmonary tuberculosis. The association with the Middlesex Hospital had been strengthened by an agreement to continue undergraduate teaching at the Central Middlesex Hospital for a further 10 years, and by a scheme to exchange senior registrars after they had two years' experience in their own hospital.

TREATMENT OF TETANUS

BY

J. H. McINTYRE, M.D.

Grey Hospital, Greymouth, New Zealand

In an article on tetanus successfully treated with gallamine triethiodide ("flaxedil") Smith and Thorne (1952) advocate the use of this drug. They state that relaxation is secured on a steady level and that respiratory depression is less marked with gallamine triethiodide than with D-tubocurarine, especially in the conscious subject. It is to be noted, however, that the period elapsing between the infecting injury and the onset of symptoms in their case was at least ten days, so that the prognosis would be relatively good.

Recently we have had in this hospital two cases of severe tetanus in children in which the periods elapsing between injury and the onset of symptoms were under a week, being in one case four days and in the other six days. Both of these children died, one in 24 hours and the other in three days, despite treatment with gallamine triethiodide and the usual treatment with sedation, antitoxin, and antibiotics. Gallamine was not conspicuously successful in either of our cases in relieving spasm, although used in much the same doses as in the case of Smith and Thorne, and, in addition, we found it apt to cause respiratory embarrassment.

Case 1

A girl aged 4 was admitted to Grey Hospital on December 12, 1952. The mother stated that the child had cut her left thumb in the garden on some glass six days previously. She now complained of neck stiffness and was unable to open her mouth. On the morning of her admission facial spasm became apparent. On examination the pulse was 120 and the temperature 98.4° F. (36.9° C.), although this rose to 102° F. (38.9° C.) within a few hours. The mouth could not be opened more than about 0.5 cm. Risus sardonicus was present. Some stiffness of the muscles of the back was apparent, and within an hour of admission two spasms occurred. On the child's left thumb a deep infected laceration was seen.

A diagnosis of tetanus was made and 20,000 units of antitoxin was given, followed by a further 60,000 within six hours. Crystalline penicillin in doses of 500,000 units, later increased to 1,000,000, was given six-hourly. As further spasms were occurring an intravenous saline drip was set up and 5 mg. of gallamine was given intravenously and 20 mg. intramuscularly. This caused a temporary cessation of respiration, and mucus had to be removed with a suction apparatus. The pulse remained steady throughout this episode. Oxygen was given by nasal catheter, and the child recovered sufficiently to talk. About one hour later two further tetanic spasms occurred, which necessitated the addition of 1 ml. of thiopentone to the drip, and gallamine was required. Despite this, several convulsions occurred. As additional sedation 30 ml. of alcohol was introduced into each vacoliter, limited to two vacoliters daily. On the third day (December 15) the child had an exceptionally severe convulsion and died. Immediate restorative measures failed, as also did cardiac massage for one hour. Throughout, the child was "specialled" by the medical staff.

A total of 27 ml. of thiopentone and 350 mg. of gallamine was given in the three days that the child lived. In addition 4.5 ml. of paraldehyde was also given, and intravenous alcohol. Despite this treatment she had convulsions of more or less severity, on an average twice or three times an hour. Respiratory embarrassment occurred seven times, and on